



**(12)**

**EUROPEAN PATENT APPLICATION**

**(21)** Application number : **92420263.3**

**(51)** Int. Cl.<sup>5</sup> : **C08H 5/00, C08G 16/02,  
B01J 20/22, C02F 1/28,  
G21F 9/12**

**(22)** Date of filing : **03.08.92**

**(30)** Priority : **07.08.91 JP 222288/91**

**(43)** Date of publication of application :  
**10.02.93 Bulletin 93/06**

**(84)** Designated Contracting States :  
**BE CH DE ES FR GB LI SE**

**(88)** Date of deferred publication of search report :  
**11.08.93 Bulletin 93/32**

**(71)** Applicant : **MITSUBISHI NUCLEAR FUEL  
COMPANY, LTD.**  
**6-1, Ohtemachi 1-chome**  
**Chiyoda-ku, Tokyo (JP)**

**(72)** Inventor : **Shirato, Wataru, c/o Tokay  
Seisakusho**  
**Mits. Nuclear Fuel Co., Ltd., 662-1,  
Funaishikawa**  
**Tokai-mura, Naka-gun, Ibaraki-ken (JP)**  
Inventor : **Kamei, Yoshinobu, c/o Tokay  
Seisakusho**  
**Mits. Nuclear Fuel Co., Ltd., 662-1,  
Funaishikawa**  
**Tokai-mura, Naka-gun, Ibaraki-ken (JP)**

**(74)** Representative : **Moinas, Michel**  
**Cabinet Michel Moinas 13 Chemin du Levant**  
**F-01210 Ferney-Voltaire (FR)**

**(54)** **Method of preparing insoluble hydrolysable tannin and method of treating waste liquid with the tannin.**

**(57)** An insoluble hydrolysable tannin is prepared by dissolving a hydrolysable tannin powder in aqueous ammonia; mixing the resulting solution with an aldehyde aqueous solution to form a precipitate; heating the precipitate; mixing the heated precipitate with a mineral acid; and filtering the resulting mixture to leave a residue on a filter. The inventive insoluble tannin exhibits high adsorption properties for heavy metal elements and is insoluble in either water, acid, or alkali. Methods for treating waste liquids and recovering heavy metal elements therefrom using the inventive insoluble tannin are disclosed.

**EP 0 527 096 A3**



European Patent  
Office

# EUROPEAN SEARCH REPORT

Application Number

EP 92 42 0263

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	AT-A-334 084 (RADIATION INTERNATIONAL AG) * the whole document *	1,5-7	C08H5/00 C08G16/02 B01J20/22 C02F1/28 G21F9/12
A	--- CHEMICAL ABSTRACTS, vol. 114, no. 21 Columbus, Ohio, US; abstract no. 207684u, 'Preparation of porous, spherical particles of tannins as absorbents' * abstract * & JP-A-3 007 297 (HEISEI) 14 January 1991	1	
D,A	--- EP-A-0 438 776 (MITSUBISHI NUCLEAR FUEL CO.) -----		
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			C08H C08G G21F
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 14 JUNE 1993	Examiner MAZET J.-F.
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons</p> <p>* : member of the same patent family, corresponding document</p>			

EPO FORM 1503 (11.82) (P0401)